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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,321	05/02/2005	Leonard A. Pomeranz	20030016	5294

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EXAMINER	
CARTER, MICHAEL W	
ART UNIT	PAPER NUMBER
2809	
MAIL DATE	DELIVERY MODE
06/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,321	POMERANZ, LEONARD A.	
	Examiner	Art Unit	
	Michael Carter	2809	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Claim 1 is objected to because of the following informalities: Claim 1 includes "the pump source" in line 3 and lacks strict antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2,4-5, 7-10, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Esterowitz et al. US Patent 4,965,803 (hereinafter referred to as Esterowitz).

4. For claim 1, Esterowitz teaches a method of pumping a wide bandwidth optical parametric oscillator to provide mid-IR radiation (column 1, lines 28-31), comprising the step of pumping the optical parametric oscillator with a Thulium laser operating by itself as the pump source (column 1, lines 53-56) for the optical parametric oscillator.

5. For claim 2, Esterowitz teaches the Thulium laser utilizes a $YAlO_3$ host (column 4, lines 1-11). While Esterowitz discloses YAlO instead of $YalO_3$, YAlO is an acronym for $YAlO_3$ (see teaching reference Sheps US Patent 6,404,7085, column 1, lines 50-51). This interpretation is further supported by the specification of the instant application (page 6, lines 10-11).

6. For claim 4, Esterowitz teaches the Thulium laser is Q-switched (column 1, line 54).

7. For claim 5, Esterowitz teaches a method of pumping an optical parametric oscillator without utilizing Holmium, comprising the step of pumping the optical parametric oscillator with a Thulium laser output (column 1, lines 28-31, 53-56).

8. For claim 7, Esterowitz teaches A Q-switched laser comprising: a laser cavity; a Thulium crystal within said cavity; and, a Q-switch within said cavity (figure 1).

9. For claim 8, Esterowitz teaches the Q-switch includes an acousto-optical Q-switch (column 3, line 26).

10. For claim 9, Esterowitz teaches an apparatus for generating infrared radiation, comprising the combination of: a Thulium laser; and, an optical parametric oscillator pumped by said Thulium laser (column 1, lines 28-31,53-56).

11. For claim 10, Esterowitz teaches the Thulium laser is a Tm:$YAlO_3$ laser. (column 2, lines 45-46, and column 4 lines 1-9). As discussed for claim 5, YAlO is a commonly used acronym for $YAlO_3$.

12. For claim 17, Esterowitz teaches the Thulium laser is selected from the group consisting of YAG, YSGG, YALO, LuAG, YLF, Y_2O_3, and YVO_4 Thulium lasers (column 4, lines 13-17).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claim 3, 6, 11, 14, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esterowitz, in view of Komine, US patent 6,215,800 (hereinafter referred to as Komine).

15. Esterowitz remains applied as above.

16. For claims 3, 6, 11, 16, and 18 Esterowitz does not teach the OPO includes a zinc germanium phosphide nonlinear crystal.

However, Komine does teach using a zinc germanium phosphide nonlinear crystal in order to provide a birefringent phase matched DFG material for the infrared region (column 12, lines 36-42).

It would have obvious to one of ordinary skill in the art, at the time the invention was made, to combine Esterowitz's laser and OPO with Komine's zinc germanium phosphide crystal in order to provide a birefringent phase matched DFG material for the infrared region.

17. For claim 14, Esterowitz does not teach the optical parametric oscillator is in the form of a linear resonator.

However, Komine teaches the optical parametric oscillator is in the form of a linear resonator (figure 3) in order to provide gain in the parametric waves (column 1, lines 30-32).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Esterowitz's device with Komine's linear resonator in order to provide gain in the parametric waves.

18. Claims 12, and 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esterowitz, in view of Komine, and further in view of Smith et al. US Patent 6,647,033 (hereinafter referred to as Smith).

19. For claims 12, 13, and 15, Esterowitz and Komine remain applied as above.

20. For claim 12, the combination of Esterowitz and Komine does not teach the optical parametric oscillator is in the form of a ring.

However, Smith does teach the optical parametric oscillator is in the form of a ring (figure 2) where the ring configuration is used in the OPO to improve beam quality (column 3, line 28-30).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the combination of Esterowitz and Komine, with Smith's configuration in order to improve beam quality.

21. For claim 13, Komine further teaches including two $ZnGeP_2$ non-linear crystals in order to increase interaction length (column 2, line 39-41).

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Esterowitz, in view of Smith.

23. For claim 15, Esterowitz does not teach the optical parametric oscillator is doubly resonant.

However, Smith does teach the oscillator is doubly resonant in order to permit oscillation at both the signal and idler frequencies (column 1, lines 27-34).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the OPO of Esterowitz, with Smith's doubly resonant cavity in order to permit oscillation at both the signal and idler frequency.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stewart, US patent, 6,162,213; Esterowitz et al., US patent 5,272,708; and Jin et al. US patent 5,854,802 , disclose an OPO with a Thulium laser. Govorkov, US patent 6,044,094, discloses an OPO using multiple $ZnGeP_2$ crystals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Carter whose telephone number is (571) 270-1872. The examiner can normally be reached on Monday-Friday, 7:00 a.m.-4:30 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MC

LEONARDO ANDUJAR
PRIMARY EXAMINER